CLAIM AMENDMENTS:

Claims 1-25 (cancelled)

26. (new) A device for performing and verifying therapeutic irradiation, the device having a radiation source for a high-energy beam and means for modulating the high-energy beam on a gantry of an irradiation device, wherein, for verification, a radiation source of an X-ray beam is disposed on a side of a target volume opposite to the radiation source for the high-energy beam such that a direction of the X-ray beam is substantially opposite to a direction of the high-energy beam, wherein a medium for detecting the X-ray beam and for detecting the high-energy beam is disposed between the radiation source for the high-energy beam and the target volume, the medium being designed to detect regions of different radiation doses of the high-energy beam, the device also having a controller connected to the medium for detecting the high-energy and X-ray beams, to the modulating means for the high-energy beam, to a drive for adjusting a position of a patient table, and to the radiation sources for the X-ray and high-energy beams, wherein the controller can be loaded with a treatment plan to control the device, the device comprising:

means for detecting an anatomy and a position of the patient in a region of the target volume via the X-ray beam by directing the X-ray beam onto the region from various directions before application of the high-energy beam;
means for comparing the detected anatomy and position of the patient to the treatment plan and for correcting the patient position and/or treatment plan, if necessary;
means for applying the high-energy beam from a radiation direction and for detecting a shape and area of various radiation doses thereof;

means for detecting at least one partial region of the target volume including an immediate vicinity thereof using the X-ray beam during an irradiation pause of the high-energy beam;
means for comparing an X-ray recording with a detected applied high-energy beam and for correcting the treatment plan, if necessary;
means for iterative repetition until a process prescribed by the treatment plan is completed for said radiation direction; and
means for repeatedly changing said radiation direction as prescribed by the treatment plan.

27. (previously presented) The device of claim 26, further comprising means for directing the X-ray beam, during irradiation pauses of the high-energy beam, onto at least one partial region of the target volume, including an immediate vicinity thereof, from various directions and within a region which is sufficiently small to remain substantially opposite to a direction of the high-energy beam in order to examine a detection region in three dimensions using data detected from various directions and for verification in real time.

28. (previously presented) The device of claim 27, wherein the radiation source for the X-ray beam is designed to describe a circular motion in a plane which is disposed about an axis extending through the target volume towards the radiation source of the high-energy beam.

29. (previously presented) The device of claim 26, wherein the controller is designed to consider a shape and position of endangered organs during verification and correction of modulation of the high-energy beam.

30. (previously presented) The device of claim 26, wherein the X-ray beam can detect a partial region of the target volume together with

an adjacent region of an endangered organ during irradiation pauses of the high-energy beam for verification in real time.

31. (previously presented) The device of claim 26, wherein the controller is structured to establish a protocol of applied radiation.

32. (previously presented) The device of claim 31, wherein the controller is structured to establish a protocol in three-dimensional space.

33. (previously presented) The device of claim 26, wherein the controller is structured to establish a protocol concerning corrections of the treatment plan for performed irradiation.

34. (previously presented) The device of claim 26, wherein the medium comprises a first medium for detecting the high-energy beam and a second medium for detecting the X-ray beam.

35. (previously presented) The device of claim 34, wherein at least one of said first medium and said second medium comprises an array of photo diodes which consist essentially of amorphous material.

36. (previously presented) The device of claim 35, wherein said photo diodes are disposed in a housing which only slightly attenuates the high-energy beam.

37. (currently amended) A computer program for controlling a device for carrying out and verifying therapeutic irradiation using a high-energy beam, the high-energy beam being modulated by a means for radiation modulation, wherein, for verification, an X-ray beam is directed onto a target volume in a direction substantially opposite to that of the high-energy beam in order to detect the target volume, and the X-ray beam is detected, relative to its direction, behind the

target volume to produce an image thereof, wherein the high-energy beam is detected in front of the target volume, the program being structured to control the device using a controller executing the following steps:

a) spatially detecting an anatomy and position of a patient in a region of the target volume via the X-ray beam by directing same onto ~~this~~ said region from various directions before application of the high-energy beam;
b) comparing the detected anatomy and position of the patient with a treatment plan and correcting the patient position and/or treatment plan if necessary;
c) applying the high-energy beam from a first direction and detecting a shape and area of various radiation doses thereof;
d) detecting at least one partial region of the target volume ~~including its direct vicinity~~, including a direct vicinity thereof, using the X-ray beam during an irradiation pause of the high-energy beam;
e) comparing an X-ray recording extracted in step d) with detection of the applied high-energy beam extracted in step c) and correcting the treatment plan, if necessary;
f) repeating steps c), d), and e) until an application prescribed by the treatment plan is completed for the first radiation direction; and
g) repeating steps c) through f) for all radiation directions prescribed by the treatment plan.

38. (previously presented) The computer program of claim 37, wherein the program is designed to control the X-ray beam from different directions during irradiation pauses of the high-energy beam, wherein these directions move within a range which is sufficiently small that

the X-ray beam direction is still substantially opposite to a direction of the high-energy beam and impinges on at least one partial region of the target volume including an immediate vicinity thereof for verification in three dimensions and in real time using data detected from different directions.

39. (previously presented) The computer program of claim 37, wherein data is obtained by causing a radiation source for the X-ray beam to describe a circular motion in a plane which is disposed about an axis extending through the target volume and towards a radiation source of the high-energy beam.

40. (previously presented) The computer program of claim 37, wherein the program is designed to analyse a shape and position of endangered organs for verification and correction of modulation of the high-energy beam.

41. (previously presented) The computer program of claim 37, wherein a partial region of the target volume, including a bordering region of an endangered organ, is detected by the X-ray beam in irradiation pauses of the high-energy beam and taken into consideration for verification in real time.

42. (previously presented) The computer program of claim 37, wherein the program is structured to establish a protocol concerning applied radiation.

43. (previously presented) The computer program of claim 37, wherein the program is structured to establish a protocol concerning corrections to the treatment plan for performed irradiation.

44. (currently amended) A control method to operate a device for carrying out and verifying therapeutic irradiation using a high-energy beam modulated by a means for radiation modulation, wherein, for verification, an X-ray beam is directed onto a target volume in a substantially opposite direction with respect to that of the high-energy beam to detect the target volume, wherein the X-ray beam is detected behind the target volume to effect an image thereof and the high-energy beam is detected in front of the target volume, the method comprising the following steps:

a) spatially detecting an anatomy and position of the patient in a region of the target volume using the X-ray beam by directing same onto ~~this~~ said region from various directions and before application of the high-energy beam;

b) comparing a detected anatomy and position of a patient with a treatment plan and correcting the patient position and/or the treatment plan, if necessary;

c) applying the high-energy beam from a first direction to detect ~~its shape~~ a shape thereof and regions of various radiation dosage;

d) detecting at least one partial region of the target volume, including its direct vicinity, using the X-ray beam and during an irradiation pause of the high-energy beam;

e) comparing an X-ray recording of step d) with a detected applied high-energy beam of step c) to correct the treatment plan, if necessary;

f) repeating steps c), d), and e) until an application prescribed by the treatment plan is completed for the first radiation direction;

g) repeating steps c) through f) for all radiation directions prescribed by the treatment plan.

45. (previously presented) The control method of claim 44, wherein the X-ray beam is directed, from different directions within a region which is sufficiently small that it is still substantially opposite to a direction of the high-energy beam, onto at least one partial region of the target volume including an immediate vicinity thereof and during irradiation pauses of the high-energy beam to detect parameters in three dimensions for verification in real time using data detected from various directions.

46. (previously presented) The control method of claim 45, wherein the data is obtained by causing a radiation source for the X-ray beam to describe a circular motion in a plane which is disposed about an axis which extends through the target volume and towards a radiation source for the high-energy beam.

47. (previously presented) The control method of claim 44, wherein a shape and position of endangered organs are taken into consideration for verification and correction of modulation of the high-energy beam.

48. (previously presented) The control of claim 44, wherein the X-ray beam can detect a partial region of the target volume having a bordering region of an endangered organ during irradiation pauses of the high-energy beam for verification in real time.

49. (previously presented) The control method of claim 44, wherein a protocol is established of applied radiation.

50. (previously presented) The control method of claim 44, wherein a protocol is established concerning corrections to the treatment plan for performed radiation application.